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Relationship of Classroom Grouping Practices to Diffusion of Students' Sociometric Choices and Diffusion of Students' Perception of Sociometric Choices.

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To test the hypothesis that the social nature of the pupil team-learning situation differs in a number of respects from nongraded and conventionally graded classroom situations, sociometric response data were analyzed from 581 students, comprising 20 classrooms in grades 7 through 12 in four western New York rural schools. The sociometric device provided for subjective and perceptive selections on the dimensions of "liking," "school competence," and "social power." The study found that greater diffusion of sociometric choices and perception of choices made by others were associated with membership in nongraded and conventionally graded classrooms than in pupil team-learning graded and pupil team-learning nongraded classrooms. This result was attributed mainly to instruction occurring at the team level with the teacher providing instruction to individual pairs. Based on an analysis of data from the classes in social studies, English, and mathematics, it was concluded that subject studied as well as class size had no appreciable effect on the sociometric choices of students. (JK)

Relationship of Classroom Grouping Practices to Diffusion of Students' Sociometric Choices and Diffusion of Students' Perception of Sociometric Choices[1]

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A number of classroom grouping procedures currently practiced in elementary and secondary schools conceivably affect the social structure of the classroom group. Among these may be listed large group instruction; team teaching; the nongraded school; homogeneous and heterogeneous grouping; and more recently, the practice of pupil-team learning (Durrell, 1964).

Pupil-team learning is a new educational technique which consists of combining students into diads, triads, and so on, for the purpose of gaining the possible advantages of mutual aid in learning. The learning task with attendant materials is "pre-programmed" and the students as Durrell (1964, p.1) describe them..."Work together, sharing, thinking and planning, exchanging methods of approach, sharing tentative soultions, correcting and evaluating each other's answers, producing either individual products or a single group product."

From this brief description, it would seem reasonable to suppose that the social nature of the pupil-team learning situation may differ in

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a number of respects from the nongraded and conventional-graded class room situations. Similarly, it might be expected that the nongraded classroom would differ in important respects from the conventional-graded classroom. To mention an obvious difference, the typical nongraded class is often less homogeneous along the dimension of age than the graded class. Age and correlated developmental maturity factors are among the determinants of the social structure of the group, which in turn may affect academic achievement and satisfaction with the school (Gildewell, Kantor, Smith & Stringer, 1966).

The relationship of classroom organization to classroom social structure has been the subject of several earlier research studies. Dietrich (1964) compared the social structure of sixth grade classrooms in a school which practiced heterogeneous ability grouping with sixth grade classrooms in a school which practiced homogeneous ability grouping. No significant differences in classroom social structure were found between the two school systems, but a tendency was found for students in heterogeneously grouped classrooms to associate on the basis of ability.

An extensive study of ability grouping in the public schools was recently conducted by Borg (1965). One phase of the study consisted of an evaluation of the effects of homogeneous versus heterogeneous grouping practices on the social structure of elementary school classrooms. The following conclusions were reported:

(1) Ability grouping did not create a permanent leadership vacuum in the lower ability groups. A new social structure rapidly emerged in these groups after grouping.

(2) High ability students generally lost some social status as a result of ability grouping.

(3) Average and low ability students generally gained in social status as a result of ability grouping.

(4) In heterogeneously grouped classes social status and academic ability were highly correlated, but no significant relationships existed between these two factors in homogeneously grouped classes.

Forlano (1964) found a more diffuse social structure in classrooms where "core" subjects were being taught as opposed to "non-core" subjects. Interestingly, the differences increased with duration of the program of grouping students around the basic core subject areas.

Lambert, Wiersma, Goodwin, & Roberts (1964) observed changes in social structure in fourth, fifth, and sixth grade classes over a five month period. The classes were classified as either "team taught" or "self contained." No significant differences were found between these two classroom organizations in relation to changes in classroom social structure.

Generally, the studies cited have supported the hypothesis that classroom social structure is related to the grouping procedure employed. Additional research, however, is needed to determine the extent and direction of this relationship in terms of recent innovations in grouping practices.

The present report is a preliminary analysis of sociometric data from a larger study of the psychological, social and achievement correlates of the classroom grouping procedures: (a) pupil team learning-nongraded; (b) pupil team learning-graded; (c) conventional-nongraded; and (d) conventional-graded. Classrooms within these four grouping procedures were examined in relation to diffusion of sociometric choice and diffusion of perception of sociometric choice along the three dimensions of liking, school competence, and social power.

Method

The research sample consisted of 581 students in grades 7 through 12, in four rural schools of western New York. A total of 20 intact class-

rooms were used in the analyses. The classes selected were roughly comparable on IQ and subject studied within grade levels for each treatment group, and were also fairly comparable in geographic location and socioeconomic status of their respective communities. The distribution of subjects by school, classroom organization, grade level, and subject studied is presented in table 1.

Table 1

Subjects were administered a six item sociometric device which allowed unlimited choice of fellow class members with respect to the dimensions of "liking," "school competence," and "social power." The instrument was administered individually to each class of the sample. The first three items required selection of others (i.e., classmates) along the three dimensions. The remaining three items asked the student to indicate those whom he throught had selected him. An index of diffusion of sociometric choice was obtained for each student on each of the first three items by dividing the number of times the student was selected by the number of students in his class minus one, and multiplying the resulting score by 100. Scores for the last three items were derived by dividing the number of selections a student made by the number of students in his class minus one, and multiplying by 100. Student scores on each item were then used to derive arithmetic mean scores for individual classes, schools, subject areas, treatment groups, and grade levels. Higher class means on the first three items were interpreted as indicating a greater degree of selection by individual students and, hence, a more diffuse classroom social structure; lower scores were interpreted as indicating a more limited number of selections relative to the total number possible and, hence, a less diffuse structure.

The validity of the diffusion index was examined by comparing the distribution of selections in the two classes having the highest indexes with the two classes having the lowest indexes on the "liking" dimension. The results of this analysis, shown in Table 2, indicate that classes with high indexes of diffusion were characterized by general social acceptance of all students in the class. Classes with low indexes of diffusion for this item were characterized by general social acceptance of only a few students with the remainder of the class being accepted by a relatively small percentage of their classmates or being socially neglected. Therefore, the interpretation of the derived indexes as an indication of classroom social diffusion seemed to be supported.

Table 2

The data for the four treatment groups of the study were than analyzed using a one-way analysis of variance of the treatment group scores for each item in the sociometric device. Significant differences among the means of the treatment groups were further analyzed using Ducan's Multiple Range Test (Edwards, 1960).

Results

The treatment group means, standard deviations, and between-group F-ratios for each item of the sociometric device, and the results of the application of Ducan's Multiple Range Test to the group means are summarized in Table 3. The between-groups F-ratio was significant at beyond the .005 level on the item relating to student perception of "social power." The between-group F-ratios for the other five dependent variables exceeded the .001 level. Inspection of the means for the four treatment groups indicated that greater diffusion of sociometric choices and perception of choices made by others were associated with membership in nongraded and conventional classrooms. For the tow items relating to "liking" and for the two items relating

to "school competence" the treatment groups in order of most to least diffuse were: (1) conventional-graded; (2) conventional-nongraded; (3) pupil team learning-graded; and (4) pupil team learning-nongraded. For the two items relating to "social power" the order from most to least diffuse was: (1) conventional-graded; (2) conventional-nongraded; (3) pupil team learning-nongraded; (4) pupil team learning-graded.

Table 3

The results of Duncan's Multiple Range Test indicated that, for every item of the sociometric device, the means for the two pupil team learning groups, both nongraded and graded, were significantly lower than the means for the conventional-graded group. For the two items relating to the dimension "liking," the pupil team learning groups means, both graded and nongraded, were significantly lower than the means for both the conventional-nongraded and the conventional-graded groups. For the item relating to perception of "school competence" and for the item relating to perception of "social power," the two pupil team learning groups were significantly different from the conventional-graded group, but not from the conventional-nongraded group. For the items relating to selection of others on the basis of "school competence" and "social power," the conventional-graded group was significantly different from the other three groups. On none of the items were the two pupil team learning groups, graded and nongraded, significantly different from each other, and on only two items; viz., selection of others on the basis of "school competence" and "social power," was the conventional-nongraded group significantly different from the conventional-graded group. The pupil team learning groups consistently showed the least dispersion of sociometric choice, and the conventional-

graded group was consistently the most diffuse.

In order to confirm that these differences reflected actual treatment differences rather than differences between schools, a seperate analysis of variance was performed for school C. School C, as can be seen from table 1, was the only school of the study having at least one class in each treatment group, and was the only school having classes in the pupil team learning treatment groups. The treatment group means, standard deviations, between groups F-ratios and results of the application of Ducan's Multiple Range Test for each item of the soicometric test for school C are presented in Table 4.. As can be seen in table 4, significant differences were found to exist between the pupil team learning-nongraded group and the conventional-nongraded and graded groups on the two items relating to social acceptance. Paralleling the findings of the larger analysis the pupil team learning-nongraded group contributed significantly lower mean scores than either of the conventional groups on these two items.

Table 4

Since the classes for which sociometric data were collected represented classes in social studies, English, and mathematics, a one-way analysis of variance of mean indexes on each of the six sociometric items for these three subject areas was performed. The resultant F-ratio was not satistically significant. It was concluded, therefore, that subject studied had no effect on the sociometric choices of students.

Another factor that may have affected the observed results of the study was class size. However, an examination of the correlations of class size with the items of the sociometric device shown in Table 5, indicate that the correlations were not significant ($P<.05$) for three of the items

and were very low but significant ($P<.05$) for the three remaining items. It seems safe to conclude that class size may be eliminated as an alternative to the treatment factor examined in this research.

Table 5

Another interesting observation can be made from Table 5. The items on Part I of the device correlate fairly highly with each other as do the items on Part II, but the correlations between items on Part I and items on Part II are relatively low, althouh significant ($P<.05$). This finding indicates that the extent of the relationship between the number of other students selecting an individual and the number of other students who were perceived by that individual as selecting him tended to be low, thus supporting previous findings reported by Glidewell, et al. (1966).

Discussion

Research on Classroom social structure has generally indicated that a diffuse classroom structure is associated with a decrease in the accuracy of students' perceptions of own social status and greater spread of acceptance among the students. These factors in turn are associated with a more positive attitude toward school and greater academic acheivement (Glidewell et al., 1966). A hierarchical structure has generally been identified with the reverse of these characteristics.

The device used in the present study can be described only as a measure of dispersion or diffusion of students sociometric choices. The higher the mean score for any classroom group, the more diffuse the structure of that group can be assumed to be. The lower the mean score is, the less diffuse is the structure. No assumptions can be made, however, relative to the existence of a hierarachical structure.

Some conjecture can be made relative to the reasons for the lower mean index scores within the pupil team learning classes. These classes were organized so that each pupil was paired with another pupil for the purposes of working together, studying together, and in some cases taking examinations together. Once these pairs were established at the beginning of the school year, they generally remained unchanged throughout the year. Thus, while some necessary discussion and instructional activities took place at an "all class" level, most instruction and discussion occurred at the pupil team level with the teacher, or teachers, circulating throughout the room providing instruction and advice to individual pairs. This instructional approach may be expected to prevent extensive social interaction among the students and, hence, the pupil team learning classes had the lowest mean scores of diffusion. However, this lack of social diffusion cannot be interpreted as the result of a hierarchical structure, and therefore the negative attributes of such a structure do not necessarily apply to the pupil team learning situation.

TABLE I

Distribution of Sample by Treatment, School, Subject Area, and Grade Level

Classes and Students by Subject Area and Approximate Grade Level		Treatment Group[a] PTNG (School C)	PTG (School C)	CNG (School A)	CNG (School D)	CG (School A)	CG (School B)	CG (School C)	Total
7th to 9th Math	Classes	1			3	1		2	7
	Students	37			54	29		45	165
	Mean IQ	88			92	105		99	95
7th to 9th Social Studies	Classes		1		1	1	1	1	5
	Students		26		26	31	24	31	138
	Mean IQ		111		104	118	116	109	111
10th to 12th Math	Classes	1		1	1	1			4
	Students	47		42	33	26			148
	Mean IQ	127		121	122	124			124
10th to 12th English	Classes		1		1	1	1		4
	Students		36		49	25	20		130
	Mean IQ		103		88	102	131		101
Total	Classes	2	2	7		9			20
	Students	84	62	204		231			581
	Mean IQ	109	106	104		111			108

[a] PTNG-pupil team learning, nongraded; PTG-pupil team learning, graded; CNG-conventional, nongraded: CG-conventional, graded.

TABLE 2

equency Distribution of Students in Various Categories of Social Acceptance for the Two Most Diffuse and the Two Least Diffuse Classes on Item #1

ffusion Index by Class	Class Members	Frequency of Selection 0	1-5	6-10	11-15	≥ 16
59.03	N	0	1	4	3	25
	%	0	3	12	9	76
51.03	N	0	0	8	6	15
	%	0	0	28	21	52
18.00	N	1	17	7	1	0
	%	4	65	27	4	0
14.08	N	2	22	12	0	1
	%	5	59	32	0	3

TABLE 3

Observed Differences Between Treatment Group Means Using Duncan's Multiple Range Test[a] (All Schools)

Item Part I[b]	Treatment Group Means[d]				Between Groups F-Ratio
a. Liking	PTNG	PTG	CNG	CG	16.57*
	($\bar{X}$=18; s=13)	($\bar{X}$=23; s=13)	($\bar{X}$=31; s=21)	($\bar{X}$=35; s=21)	
b. School Competence	PTNG	PTG	CNG	CG	7.81*
	($\bar{X}$=18; s=13)	($\bar{X}$=19; s=11)	($\bar{X}$=21; s=15)	($\bar{X}$=26; s=)	
c. Social Power	PTG	PTNG	CNG	C	9.33*
	($\bar{X}$=11; s=9)	($\bar{X}$=12; s=1)	($\bar{X}$=13; s=12)	($\bar{X}$=18; s=15)	
Item Part II[c]					
a. Liking	PTNG	PTG	CNG	CG	13.08*
	($\bar{X}$=14; s=12)	($\bar{X}$=17; s=11)	($\bar{X}$=24; s=21)	($\bar{X}$=26; s=18)	
b. School Competence	PTNG	PTG	CNG	CG	6.58*
	($\bar{X}$=15; s=16)	($\bar{X}$=15; s=13)	($\bar{X}$=21; s=20)	($\bar{X}$=24; s=21)	
b. Social Power	PTG	PTNG	CNG	CG	4.69**
	($\bar{X}$=14; s=15)	($\bar{X}$=14; s=16)	($\bar{X}$=17; s=17)	($\bar{X}$=21; s=19)	

a. Any two treatment group means not connected by the same underline are significantly different at the $p < .01$ level.
b. Selection by others.
c. Perceived selection by others.
d. PTNG-Pupil Team Learning, Nongraded; PTG-Pupil Team Learning, Graded; CNG-Conventional, Nongraded; CG-Conventional, Graded.

*Significant between group differences are indicated at the $p < .001$ level.

**Significant between group differences are indicated at the $p < .005$ level.

TABLE 4

Observed Differences Between Treatment Group Means Using Duncan's Multiple Range Test[a] (School C)

	Item	Treatment Group Means[d]				Between Groups F-Ratio
	Item Part I[b]					
1.	Liking	PTNG ($\bar{X}$=18; s=13)	CG ($\bar{X}$=23; s=12)	PTG ($\bar{X}$=23; s=13)	CNG ($\bar{X}$=25; s=15)	3.33*
2.	School Competence	PTNG ($\bar{X}$=18; s=13)	CG ($\bar{X}$=18; s=10)	CNG ($\bar{X}$=18; s=14)	PTG ($\bar{X}$=19; s=11)	0.27
3.	Social Power	CG ($\bar{X}$=11; s=7)	PTG ($\bar{X}$=11; s=9)	CNG ($\bar{X}$=12; s=8)	PTNG ($\bar{X}$=12; s=11)	0.32
	Item Part II[c]					
4.	Liking	PTNG ($\bar{X}$=14; s=12)	PTG ($\bar{X}$=17; s=11)	CG ($\bar{X}$=18; s=14)	CNG ($\bar{X}$=20; s=11)	2.28**
5.	School Competence	PTNG ($\bar{X}$=15; s=18)	PTG ($\bar{X}$=15; s=13)	CG ($\bar{X}$=17; s=16)	CNG ($\bar{X}$=18; s=19)	0.51
6.	Social Power	PTG ($\bar{X}$=14; s=15)	PTNG ($\bar{X}$=14; s=16)	CNG ($\bar{X}$=14; s=16)	CG ($\bar{X}$=15; s=17)	0.06

a. Any two treatment group means not connected by the same underline are significantly different at the $p<.10$ level.

b. Selection by others.

c. Perceived selection by others.

d. PTNG-Pupil Team Learning, Nongraded; PTG-Pupil Team Learning, Graded; CNG-Conventional, Nongraded; CG-Conventional, Graded.

*Significant between group differences are indicated at the $p<.025$ level.

**Significant between group differences are indicated at the $p<.10$ level.

TABLE 5

Intercorrelations of Sociometric Variables and Class Size

Variables	1	2	3	4	5	6	7
1. Class Size	----						
2. Liking	-.07	----					
3. School Competence	-.09	.75	----				
4. Social Power	-.12	.76	.73	----			
5. Perception of Being Liked	-.05	.47	.35	.36	----		
6. Perception of own School Competence	-.02	.29	.31	.27	.67	----	
7. Perception of own Social Power	-.09	.21	.21	.25	.55	.63	----

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